

REMARKS

Claims 1-20 are pending in the application. Claims 1, 3, 11-12, 16-17, and 19 are amended above to more clearly claim what it is that the applicants regard as their invention. No new matter has been added to the application by these claim amendments.

The examiner's claim objections and rejections are overcome or they are traversed as set forth below.

I. THE CLAIM 15 OBJECTION

The examiner objected to claim 15 for having an improper multiple dependent claim form. This objection is overcome by amending claim 15 above to refer to the multiple dependent claims in the alternative.

II. THE SECTION 112, 2nd PARAGRAPH REJECTION OF CLAIM 19

The examiner rejected claim 19 for including the term "approximately". This rejection is overcome by replacing the word "approximately" in claim 19 with the word "about". The word "about" is a well recognized and accepted term of art that is commonly used in patent claims.

III. TRAVERSE OF THE OBVIOUSNESS REJECTIONS

A. The Claim Amendments

Independent claims 1 and 16 are amended above to clarify that the primary sensor is a passive sensor adapted to measure an ambient magnetic field. The amendment finds basis in the specification as originally filed (See paragraph 20 of the published U.S. specification). Moreover, reference to the primary sensor in the claims is amended above to include the limitation that the primary sensor comprises first and second magnetic sensors (formerly recited in original claims 11 and 12) adapted to measure the ambient field within a localized volume of space defined by the zone of sensitivity of said first and second sensors. The amendment finds basis in the original specification (See paragraphs 36 - 38 of the published U.S. specification). Finally, claims 1 and 16 have been amended to recite an additional element, namely an audible and / or visible warning within the vicinity of the primary sensor. This amendment finds basis in original claim 3 and in the original specification description (See paragraph 16 of the published U.S. specification). These claim amendments render claims 1-20 patentable over the prior art of record.

B. Traverse of the Obviousness Rejections of Claims 1-20 Over Akers (USP 3573817)

The examiner rejected claims 1-20 for obviousness over Akers (USP 3,573,817) either alone or in combination with Diaz (USP 6,304,644), Yoo (USP 5,726,628), Johnstone et al. (USP 6,133,829), Turner (U.S. Pat. Pub. 2004/0000999), or Koop (U.S. Pat. Pub. 2003/0171669). It is the examiner's position that Akers discloses all of the features of original claims 1-3 and 14-17 except for providing an output when both the proximity sensor and the magnetic sensor are triggered. The examiner takes the position that this feature is obvious from the teachings of Akers.

Claims 1-20 are inventive over Akers and the other cited prior art references. As an initial matter, the skilled person having regard to the object of the present invention would not be motivated by the teaching in Akers to modify the system therein with any expectation of achieving the technical effect of the present invention. Moreover, Akers teaches away from the present invention in several aspects. Claims 1-20 are also patentable because Akers and the other cited references do not disclose or suggest every feature of the claimed invention.

1. There Is No Motivation For Considering Akers

The present invention relates to an apparatus and method of detecting variations in an ambient magnetic field due specifically to a ferromagnetic object therein. In contrast, Akers teaches a complex signaling alarm system responsive to a plurality of conditions aimed at classifying or characterising an intruding body.

An aim of the present invention is to provide a simple, autonomous detector adapted to detect ferromagnetic objects and which does not require a skilled operator to analyse outputs therefrom (See Paragraphs 1 – 15 of the published U.S. application). In contrast, the monitoring system described in Akers is aimed at identifying a range of intruding bodies based on "target signatures" derived from a plurality of sensors, each sensitive to a different phenomenon (e.g. seismic, magnetic, electromagnetic, proximity, audio sensors etc.). The system described in Akers is used to distinguish between target signatures (rather than merely detect a single target signature as in the present invention) and thus to distinguish between intruding bodies (See Akers, col. 2, lns. 5–11).

A person skilled in the art, working within the field of the present invention would not have been aware of Akers due to the disparate objectives to which Akers and the present invention are addressed. Accordingly, the person skilled in the art seeking to provide a simple, autonomous, ferromagnetic object detector would not have been aware of the teaching in Akers.

2. Claims 1-20 Are Patentable Because They Include Features Not Disclosed Or Suggested By The Recited Prior Art

Even if the skilled person were aware of Akers it would not have been obvious to modify the Akers system with any expectation of producing the present simple, autonomous detector. The plurality of sensors and the complexity of the monitoring system described in Akers teach away from the simple detection systems of the present invention.

Furthermore, the monitoring system described in Akers requires skilled operators to interpret the signals received remotely there-from. There is no teaching in Akers that the monitoring system is adapted to autonomously detect an intruding object having a specific target signature. Indeed, absent the skilled operator, the system is incapable of doing so. The monitoring system in Akers transmits information relating to the separate sensor channels, albeit using a simultaneous-signal concept to initiate the transmission. It then is incumbent upon the skilled operator in Akers to correlate the information from the separate sensors in order to identify an intruding body. To reiterate, the separate signals from the individual sensors are only indicative of the characteristic of the target's signature. They are only able to provide information that assists the skilled operator in discriminating between different targets (See e.g., Akers col. 7, lns. 35- 36).

Applicant asserts that it would be counter intuitive to dispense with the skilled operator taught in Akers and merely use the simultaneous-signal concept described therein as a reliable method for detecting ferromagnetic objects. At least part of the inventive concept behind the present invention lies in the realisation that reliable detection can be achieved by automatically correlating signals from a magnetic sensor and a non-magnetic sensor without any input from a skilled operator.

Akers also teaches away from the present invention in terms of the manner in which the monitoring system responds to sensory inputs. As mentioned above, one of the objectives of the present claimed ferromagnetic object detector is to automatically provide an audible or visible warning in the vicinity of the primary sensor so as to directly alert personnel of the existence of a ferromagnetic object within the local environment. Whilst the apparatus described in Akers does produce an "alarm", the alarm is a message transmitted to a remote monitoring station (See Akers at col. 7, lns. 11-14). Akers does not disclose or suggest the use of (1) an audible or a visible warning; or (2) an audible or visible warning given in the vicinity of the monitoring system. Indeed, such a local warning is undesirable in the case of the monitoring system of Akers since the system is a covert

monitoring system for use in remote surveillance applications (See Akers at col. 1, Ins. 5-40). Thus, Akers teaches against providing an alarm in the vicinity of the monitoring apparatus.

The present ferromagnetic object detector also aims to reduce false alarms due to interference from non-hazardous ferromagnetic objects moving within an extended zone of sensitivity. This is accomplished, as claimed, by using a secondary non-magnetic sensor and confining the region within which ferromagnetic objects are detectable to a zone of sensitivity of a pair of magnetic sensors. The use of first and second magnetic sensors enables reliable detection within a localised volume of space rather than omni-directionally around a single magnetic sensor (See amended claims 1 and 16 above and paragraphs 37 and 38 of the published U.S. specification).

In contrast, Akers utilises an omni-directional and multi-orientational magnetic sensor capable of detecting when a ferromagnetic object is carried anywhere past the monitoring unit (See Akers at col. 5, Ins. 64-67). Accordingly, Akers does not disclose or suggest the claimed sensor array. Moreover, Akers teaches away from confining the detection region of the magnetic sensor in the manner as claimed herein. Claims 1-20 are believed to be patentable for each of these reasons.

3. Traverse of The Obviousness Rejection Of Claims 4 and 20

The examiner combined Akers and Diaz to reject claims 4 and 20 for obviousness. Claims 4 and 20 are believed to be patentable for the reasons recited in sections III (B) (1 & 2) immediately above.

In addition Diaz discloses an elaborate access control chamber security system primarily intended for preventing armed robberies at banks or the like. The complexity of the access control system described in Diaz teaches away from the simple detection and access control system of the present invention.

As already mentioned, the entire teaching in Akers is directed towards a covert monitoring system for use in remote surveillance applications. In this respect Akers teaches away from providing an alarm or controlling access within the vicinity of the monitoring apparatus. As a result of this teaching away, one of ordinary skill in the art at the time of the invention would not have been motivated to modify the device disclosed by Akers according to the teachings of Diaz to integrate any access control device more specifically a lockable door as an access control device.

4. Traverse of The Obviousness Rejection Of Claims 5-7 and 10

The examiner combined Akers and Yoo to reject claims 5-7 for obviousness. The examiner also combined Akers and Turner to reject claim 10.

A primary objective of the present invention is to detect the presence of ferromagnetic objects in the vicinity of a magnetic resonance imaging (MRI) scanner. (See paragraph 2 of the published U.S. specification). A related object of the presently claimed invention is to provide an apparatus that does not transmit large amounts of electromagnetic energy into the environment in order to detect ferromagnetic objects. Such a passive detector is particularly desirable in a clinical environment where sensitive medical equipment abounds.

In contrast to the foregoing features of the claimed invention, Yoo and Turner relate to active magnetic detection systems and therefore teach away from the present passive ferromagnetic object detector. Accordingly, it would be counter-intuitive for the skilled person to combine the teachings of Yoo or Turner with that of Akers. The teaching within Akers to a covert, passive detector appears incompatible with the overt, active systems taught in Yoo and Turner.

5. Traverse of the Obviousness Rejections of Claims 5, 8-9, 11-13 and 18-19

The examiner rejected claims 5 and 8-9 for obviousness over Akers in view of Johnstone. The examiner also rejected claims 11 – 13, 18 and 19 for obviousness over Akers in view of Kopp.

Claims 5, 8-9, 11-13 and 18-19 are non-obvious and patentable for at least the reasons recited in Sections III(B)(1 & 2) above.

Moreover, as with the other secondary references cited by the examiner, there is no motivation for the skilled person to combine the teaching of the complex, covert signaling alarm system found in Akers with the teachings in Johnstone or Kopp.

IV. TELEPHONE INTERVIEW

The examiner is invited to call the applicant's patent attorney at the phone number identified below to discuss this application if the examiner is of the opinion that such a conversation will facilitate the allowance of this application.

CONCLUSION

Amended claims 1-20 are believed to be allowable over the prior art for at least the reasons recited above. Favorable reconsideration and allowance of the pending application claims is, therefore, courteously solicited.

Respectfully submitted,

McDonnell Boehnen Hulbert & Berghoff LLP

By: 

A. Blair Hughes
Reg. No. 32,901
312-913-2123

Date: December 22, 2005